

**REMARKS/ARGUMENTS**

Applicant has amended the claims in response to the office action for the sake of clarity. Support for the claim amendments may be found throughout the specification. In particular, support for Claims 90-97 may be found, for example, on page 13, paragraphs 60-63. Paragraph 60 notes that the compositions of the present invention kill bacteria that contaminate food and have been found to be lethal to contaminators of homes and public buildings. Further, paragraphs 60 and 62 on page 13 note several loci that may contain the target microbes, including food, homes and public buildings (paragraph 60) and containers of post harvest food, building materials, and the space between building materials (paragraph 61).

In addition, the examples provide support for the claim amendments. Example 10, which starts on page 29, describes use of the compositions of the present invention to inhibit the growth of a post harvest pathogen, *Rhizoctonia solani*. Example 11, which is set forth in paragraph 106 and which was added via a previous amendment, shows how compositions produced by Muscodor, are used to inhibit the growth of another fungus, *Penicillium expansum*, in a container of post harvest food (i.e., apples). In addition, Table 11 on page 35 shows the inhibitory and lethal effect of volatile organic compounds produced by Muscodor, which include isobutyric acid and 3-methyl-1-butanol (as set forth in Table 6 on page 24), on a variety of microbes.

Support for the effective amount limitation may be found on page 5, paragraph 27, in which an effective amount is defined as an amount sufficient to inhibit the growth of a pest.

Support for the relative ratios of certain volatile organic compounds recited in Claims 90 and 98-100 may be found throughout the specification. For example, Tables 7, 8, 9 and 10 set forth the relative ratios of volatile organic compounds recited in the claims, as applied to a locus containing a target microbe. Specifically, Table 7 describes application to a target microbe of a composition comprising volatile organic compounds comprising 100% isobutyric acid. Tables 8, 9, 10 describe various mixtures of volatile organic compounds. For example, Mixtures 11-22 in Table 8 and all of the mixtures in Tables 9 and 10 describe compositions in which the relative ratio of isobutyric acid to total volatile organic compounds is about 5%. The relative ratio of 2-methyl-1-butanol shown in Mixtures 11-13, 19-20 and 22, in Table 8 on page 32, which mixtures also all contain isobutyric acid, is at least about 25%. The relative ratio of 3-methyl-1-butanol shown in Mixtures 17-18 and 23 in Table 8, which mixtures also all contain isobutyric acid, is at least about 25%. The relative ratio of isobutyl alcohol shown in Mixtures 19, 21, 22 and 23 of Table 8, which also each contain isobutyric acid and either 2-methyl-1-butanol or 3-methyl-1-butanol is at least about 25% and the relative ratio of isobutyl alcohol shown in the mixtures described in Tables 9 and 10 is about 5%. Finally, the relative ratio of ethyl butyrate shown in Mixtures 19-23 of Table 8, which also each contain isobutyric acid and either 2-methyl-1-butanol or 3-methyl-1-butanol, is at least about 25%.

Rejection of Claims 72 and 77-89 under 35 U.S.C. Section 112, First Paragraph (Written Description) – Recitation of “between zero and \_\_\_\_ ppm”

The Examiner rejected Claims 72 and 77-89 under 35 U.S.C. Section 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the invention. In particular, the Examiner found no support for the phrases “between zero and 2800 ppm” or “between zero and 2500 ppm” and noted that the specification clearly is directed to “less than.” In response, Applicant has presented new claims that include the “less than” language. Therefore, Applicant requests that this rejection be reconsidered and withdrawn.

Rejection of Claims 72 and 77-89 under 35 U.S.C. Section 112, Second Paragraph (Indefiniteness)

The Examiner also rejected Claims 72-82 under 35 U.S.C. Section 112, second paragraph as being indefinite. The examiner’s specific rejections are set forth below.

*“between zero and \_\_\_\_ ppm”*

The Examiner asserts that the phrase “between zero and \_\_\_\_ ppm” is vague and indefinite. Applicant has amended the claims to recite “less than \_\_\_\_ ppm” of certain volatile organic compounds and to require a certain relative ratio of each volatile organic compound to total volatile organic compounds. The recitation of this minimum relative ratio addresses the Examiner’s previous concern that “less than \_\_\_\_ ppm” also includes

zero. In light of this amendment, Applicant believes the rejection has been rendered moot and requests its reconsideration and withdrawal.

*“in a closed environment”*

The Examiner also asserts that use of the term “in a closed environment” is unclear since “the size of the environment is not clearly defined.” The newly added claims do not include this language and instead refer to a locus. As noted above, Applicant has identified several potential loci where target organisms reside throughout the specification, including, for example, on page 13, paragraph 60 (food, homes and public buildings) and on page 13, paragraph 61 (food, containers of post harvest food, building materials and the space between building materials). In light of these amendments, Applicant believes this rejection has been rendered moot and requests its reconsideration and withdrawal.

*“bacteria that contaminate buildings”*

The Examiner also asserts that the phrase “bacteria that contaminate buildings” is unclear and that *Stachybotrys* is incorrectly referred to as a bacterium in Claim 89. The newly added claims do not include the phrase “bacteria that contaminate buildings” and instead refer only to fungi that contaminate buildings, as discussed in the specification. In addition, new claim 96, which refers to *Stachybotrys* sp., correctly refers to it as a fungi. Therefore, these rejections have been rendered moot, and Applicant respectfully requests their reconsideration and withdrawal.

*“effective amount”*

The Examiner asserted that the term effective amount “appears contradictory and confusing...wherein the maximum is 2800 ppm or 2500 ppm of a volatile, or almost any amount.” Applicant has addressed this rejection for the sake of advancing prosecution by adding a further claim limitation that requires the volatile organic compound to comprise at least a certain relative ratio of total volatile organic compounds, as disclosed in Tables 7-11 on pages 31-33 of the application.

The Examiner also asserts that “it is unclear whether the volatile organic compounds recited in minute amounts are, in fact, active ingredients in the effective amount of the composition.” See page 3, fourth full paragraph of 1/30/2007 office action. The new claims require a minimum relative ratio of each volatile organic compounds which corresponds to the ratios set forth throughout the specification and, specifically, in Table 8. All of the mixtures in Table 8 were effective to inhibit growth of a target microbe and were present at very low concentrations.

In addition, Applicant notes that those of ordinary skill in the art have long known that minute amounts of volatile organic compounds can inhibit post harvest pathogens. For example, a 1973 paper reporting on the control of postharvest decay of fresh raspberries using acetaldehyde vapor found slight growth inhibition of *Fomes annosus* at 100 ppm acetaldehyde and complete inhibition at 500 ppm, and above. See Prasad, K. and Stadelbacher, G. Plant Disease Reporter (September 1973) 57(9): 795-797 at 796. (A copy of this paper is enclosed for the Examiner’s convenience.) In light of the claim amendments and the above arguments, Applicant respectfully requests that the rejections

as to the claimed concentrations of volatile organic compounds be reconsidered and withdrawn.

The Examiner asserted that certain dependent claims improperly depended from Claim 72 for various reasons. Because Applicant has cancelled the old claims and presented new claims, this rejection has been rendered moot. Applicant reviewed the dependency rejections in the office action and wrote the new claims so as to avoid similar rejections.

Rejection of Claims 84-89 under 35 U.S.C. Section 112, First Paragraph (Enablement)

*Response to Arguments on Pages 4-6*

The Examiner also rejected the claims under 35 U.S.C. Section 112 first paragraph, asserting lack of enablement. Specifically, the Examiner asserted on page 4 of the Office Action in the second paragraph under the heading "Response to Arguments" that "applicant has not defined the purpose of the effective amount with any particularity." In the newly added claims, Applicant has made clear that an effective amount is the amount needed to inhibit growth of one or more microbes that are contaminating a certain locus. Through routine experimentation based on the disclosures in the specification, one of skill in the art would be able to determine this effective amount. As described in a previous response to office action, Applicant has conducted routine experiments with the claimed volatile organic compounds to determine the effective amount as to several microbes. See Declaration of Mercier submitted with Response to Office Action dated July 5, 2006. A copy of the Declaration is enclosed for the Examiner's convenience.

In addition, the Prasad paper (1973) mentioned above describes the variation of concentration of acetaldehyde vapor to determine an effective amount of the vapor to control decay on raspberries. Because those of skill in the art would be able to determine effective amounts in a similar manner through routine experimentation with the claimed compositions, Applicant requests reconsideration and withdrawal of this rejection.

The Examiner also rejects Claims 84-89 for lack of enablement. In particular, the Examiner stated: "The specification as-filed does not provide sufficient guidelines for inhibition of any and all bacteria or fungi that contaminate post harvest food or buildings or the scope of 'closed' with respect to an environment." The new claims recite a locus contaminated with one or more bacteria or fungi and does not require a closed environment. Instead, the new claims require that certain volatile organic compounds are present in the loci at certain concentrations and at relative ratios which are similar or greater than the ratios of volatile organic compounds produced by *Muscodor*, which inhibits the growth of a wide range of bacteria and fungus.

Those of skill in the art would know how to apply the teachings of the specification to different loci infected with microbes. For example, a 2001 paper regarding use of acetic acid vapor to control decay of stored apples describes the scale-up of small trials. In these small trials, apples contaminated with *P. expansum* were fumigated with acetic acid in fumigation chambers. (These fumigation chambers are simply more sophisticated versions of the sealed Petri plates described in the specification.) These small trial results were scaled up and acetic acid applied to containers of post harvest food, such as standard wooden or plastic apple boxes, small wooden bins, and bags of apples. See Sholberg, P.,

et al., Fruits (2001) 56(5): 355-365. (A copy of this paper is enclosed for the Examiner's convenience.) Similarly, one of skill in the art could apply the results provided in the specification to various loci containing one or more microbes of interest through routine experimentation.

Finally, the Examiner notes that some of the volatiles listed are toxic. In treating locations contaminated with microbes that infect post harvest foods or buildings with toxic compounds or with amounts that are toxic, those of skill in the art typically fumigate and then ventilate the treated location before re-entry. Therefore, whether the claimed volatile organic compounds are toxic would not prevent one of skill in the art from using them in the claimed manner. In light of the above arguments and the claim amendments, Applicant respectfully requests reconsideration and withdrawal of the above-described claim rejections under 35 U.S.C. Section 112, first paragraph for an asserted lack of enablement.

*Response to Arguments on Pages 6-7*

On page 6 of the latest Office Action, the Examiner continues the rejection based on lack of enablement, asserting that it is unclear how to vary the dosages of the claimed volatile organic compounds because "the active components are not clearly delineated" and comprise between zero and 2800 ppm isobutyric acid or between zero and 2500 ppm 2-methyl-1-butanol, which can be interpreted as lacking in isobutyric acid or 2-methyl-1-butanol." As discussed above, the new claims avoid such problems by reciting a minimum relative ratio of the volatile organic compounds; e.g., 5% isobutyric acid and 25% 2-methyl-1-butanol.



The Examiner also noted that at least some of the volatile organic compounds recited in the previous claims included volatiles produced by microbes, which, of course, did not inhibit the growth of such microbes. However, the papers the Examiner cited (Nout and Robinson) deal with 3-methyl-1-butanol and /or 2-methyl-1-butanol and with isobutanol. For this reason, among others, these references are not relevant to the presently presented claims, which require the presence of isobutyric acid, which is not mentioned in the cited references. In light of the claim amendments and the above arguments, Applicant respectfully requests the reconsideration and withdrawal of the enablement rejections.

Rejection of Claims 72, 77-82 and 87 under 35 U.S.C. 102(b) (Anticipation)

The Examiner rejected the claims as being anticipated under 35 U.S.C. Section 102(b) in light of various references – Sunesson (1995), Borjesson (1990), Borjesson (1992), and Kiviranta (1998). To anticipate a claim under 35 U.S.C. Section 102(b), a reference must disclose each and every limitation of that claim. The new claims all include a limitation that requires the volatile organic compounds to include isobutyric acid. In contrast, none of the references mention isobutyric acid. Therefore, the claim amendments render this rejection moot, and Applicant respectfully requests its reconsideration and withdrawal.

CONCLUSION

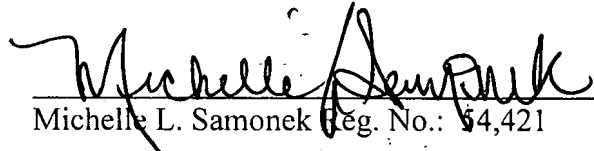
Applicant has enclosed a petition for a two-month extension of time to reply to the office action, along with a check for \$450 to cover the required fee.

In light of the above amendments and remarks, Applicant believes that each of the presently pending claims in this application is in condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. The Examiner is invited to call the undersigned at the number provided below in order to discuss any aspect of this response.

Respectfully submitted,

Dated: \_\_\_\_\_

7/2/07

  
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